**Online Certificate Generation and Validation using Blockchain**

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**Abstract**: In today's rapidly evolving educational and professional landscape, the issuance and validation of digital certificates have become essential. However, concerns about the authenticity of these digital credentials persist due to the lack of a reliable verification mechanism. To address this challenge, we present the "Blockchain-Based Certificate Generation and Validation System," a transformative solution aimed at revolutionizing how certificates are created, stored, and validated (based on Interplanetary File System). Our system leverages the power of blockchain technology to establish an immutable ledger for storing digital certificates. Government offices, students, industries, and institutes can easily generate custom certificates through a user-friendly interface. These certificates are securely stored in a Krypto-Vault System, ensuring accessibility and protection against tampering. The cornerstone of our system lies in its Certificate Validation Module, which enables third-party organizations to effortlessly verify the authenticity of certificates issued through the platform. This innovation enhances trust and transparency in the credentialing process, benefiting all stakeholders. With robust user authentication, authorization, and privacy features, the system ensures that only authorized users have control over certificate issuance and validation. A user-friendly dashboard simplifies certificate management, making it accessible to a wide range of users. This project's expected outcomes include a fully functional system, open-source code, comprehensive documentation, and interfaces designed for ease of use. By increasing trust and credibility in digital certificates, our Blockchain-Based Certificate Validation System contributes to the broader objectives of digital transformation and transparency, aligning seamlessly with the goals of the Smart India Hackathon.

**Introduction**: In the ever-evolving landscape of education and professional credentials, the need for a secure, efficient, and transparent certification validation system has become paramount. The proposed system, leveraging on technologies such as Hyperledger Fabric 2.0 and IPFS, endeavours to revolutionize certificate generation and validation processes. By addressing existing challenges through automation and tamper-proof record-keeping, this system aims to bring about a paradigm shift in the way educational institutions issue and validate certificates. In this innovative framework, educational institutions take on the role of certificate issuers, wielding exclusive rights to validate and authorize certificates. Students, in turn, have the ability to access and view their digital certificates, each linked to a unique hash for integrity verification. The integration of digital signatures facilitates seamless certificate verification by organizations, ensuring a high level of trust in the authenticity of the presented credentials. The certificate generation process is streamlined through automation, with institutions contributing templates and issuers inputting the necessary details. Upon approval, the document data undergoes transformation by hashing using IPFS technology. The resultant data is then securely stored both in IPFS and on the blockchain, leveraging the robust features of Hyperledger Fabric 2.0 to ensure the immutability and integrity of certificates. Any unauthorized changes trigger immediate notifications, adding an extra layer of security and transparency. One of the standout features of this proposed system is its user-friendly approach. Students can easily share their digital certificates with organizations, which, in turn, can verify the legitimacy of these credentials using the provided hashes. The streamlined verification process guarantees swift confirmation of the certificates' authenticity, thereby simplifying the entire validation procedure for both students and organizations. This not only enhances the efficiency of the certification validation system but also contributes to building trust and confidence in the digital certification ecosystem. In essence, the proposed system embodies a comprehensive and forward-thinking approach to certificate generation and validation, leveraging the synergy of Hyperledger Fabric 2.0 and IPFS technologies. By addressing the current challenges in a holistic manner, it aims to usher in a new era of efficiency, security, and trust in the realm of educational and professional certifications.